

# Crop diseases after drought

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Growers will be keen to generate cash flow in 2007. Often, the year after a drought has average to above average rainfall.

Unfortunately, seasons that are good for yield are often conducive to diseases. How do we capture the 'good year' while minimising the risk of serious disease?

Decisions made now about crop choice and paddock preparation can give a good return in 2007 while preparing paddocks for top production in 2008.

Let us consider the key elements.

### How drought affects plant diseases

- Drought reduces the breakdown of plant residues. This means that inoculum of some diseases does not decrease as expected and will carry over for more than one growing season. The expected benefits of crop rotation may not occur.
- Bacterial numbers decline in dry soil. Some bacteria are important antagonists of soil borne fungal diseases. These diseases can be more severe after drought.

- Within the drought year, inoculum of some diseases favoured by a wet season may not increase as expected.
- Large amounts of seed produced in abandoned crops, or pinched seed from drought stress, will fall to the ground. If there are summer rains, large numbers of volunteers will provide a summer green bridge and autumn green ramp. Low stock numbers make it difficult to control these volunteers, which provide a green bridge for rusts, viruses and virus vectors, and many other pathogens.
- Weeds that harbour diseases are harder to kill.
- Soil water and nitrogen may be unbalanced and these are likely to impact on diseases in 2007 and beyond.
- Choice of crop in 2007 can generate income in 2007 and restore paddocks for 2008.

### Cereal crops

#### Key Points

- Check particularly for crown rot and take-all. Assess the risk of yellow spot and other diseases relevant to your region.
- Check disease risk from 2005 crops because inoculum may have carried over through the drought.
- If in doubt, use available root disease tests.
- Assess disease risk for each paddock; select paddocks to minimise disease risk in 2007.
- If concerned about levels of wheat disease, consider barley or a broad-leafed crop.
- If you choose to grow wheat, identify and implement management strategies which minimise disease risk. Assess the effect of autumn rainfall on disease levels, review sowing time, control grass weeds, consider seed dressings, and select tolerant varieties.
- Consider the implications of this year's decisions for future rotation management and plan how to manage 2007 crops.



## Crown rot

Incidence of crown rot is linked to the amount of inoculum present, while yield loss is determined by incidence and post-flowering moisture stress.

Drought conditions in 2006 mean that soil nitrogen levels are likely to be high and soil moisture levels low.

The drought would have also reduced the decomposition of cereal stubbles which harbour the crown rot fungus and decreased the effectiveness of break crops.

A succession of late sowing breaks in recent seasons has also increased the amount of cereal-on-cereal grown within farming systems.

The amount of inoculum present in 2007 will be higher due to these factors. The higher inoculum levels combined with contributions from grass weed hosts will increase the risk of severe crown rot in 2007. Actual disease levels will depend on seasonal conditions, paddock history, variety, and soil water and nitrogen balance.

While barley and oats are susceptible to crown rot, they rarely sustain yield loss. However, they do contribute to inoculum.

Burning stubble reduces crown rot inoculum above ground but it rarely reduces disease levels because sufficient inoculum survives below ground. Further, burning reduces soil moisture which often leads to increased plant water stress after flowering, increasing damage from crown rot.

## Rhizoctonia root rot

Rhizoctonia root rot was widespread and severe in 2003 following the 2002 drought. Factors that favoured Rhizoctonia root rot in 2003 included:

- late sowing into cold, relatively dry soil;
- minimum cultivation, used by many farmers to get crops in quickly because of the late break;
- lighter soils low in organic matter.

However, this does not explain the severity of the disease on many different crops, including wheat, barley and lupins.

It appears that severe drought reduces the bacteria antagonistic to *Rhizoctonia solani* in the soil. *Rhizoctonia* recovers faster than the antagonists and as a result is more damaging.

Rhizoctonia root rot has the potential to be severe next year. No single treatment will control this root rot and it usually requires an integrated approach in those paddocks prone to the disease. Actions to reduce its potential include:

- greater soil disturbance at sowing (5 cm below sowing depth in red/red-brown earths, 10 cm in sandier soil), or cultivation to these depths in the fortnight before sowing;

- adequate nutrition;
- avoid sulfonyl urea herbicides;
- consider seed treatment with ability to reduce Rhizoctonia (if available).

## Take-all

Inoculum levels are likely to be similar to those at the end of the 2005 season.

Wet conditions from late winter to mid spring in 2005 meant there were relatively high levels of inoculum leading into 2006.

Dry conditions in 2006 allowed very little build-up of take-all during the year but also reduced break-down of infected stubble residues in soil, so there was relatively little decline in take-all inoculum under break crops such as canola or pulses. Weeds not controlled in 2006 will also be a source of inoculum.

Paddocks at high risk should be sown to a break crop. Consider delayed sowing of paddocks with moderate risk.

Growers should consider using a take-all effective seed dressing or an in-furrow fungicide in moderate-risk paddocks where wheat will be sown.

## Yellow spot

Inoculum levels will be low throughout NSW after 2006. There will be only a slight threat from 2005 stubbles that have not broken down.

Yellow spot is always a threat with wheat-on-wheat rotations, especially if autumn–winter has many long damp periods. Avoid sowing susceptible or very susceptible varieties into paddocks with large quantities of wheat stubbles.

## Rusts

The rust threat to 2007 will depend on rain over summer and early autumn. Destocking caused by the drought will make it more difficult to control volunteers by grazing. Concentrate on grazing volunteers from 2006 paddocks known to have highly susceptible varieties or spray these out at least two weeks prior (Feb/Mar) to sowing dual purpose wheat varieties.

## Wheat streak mosaic

This virus disease was widespread on the Central Tablelands and Central West Slopes in 2006 but its full effect was masked by the drought. Summer and autumn conditions are likely to influence its importance in 2007. New information about this disease will be given early in 2007 to assist in controlling this emerging disease.

## Other cereal diseases

Spot form net blotch was widespread in 2006 on barley, though only at low levels. Avoid sowing barley into barley stubble and use more resistant varieties where available. The disease will be present in 2007 and may increase rapidly if warm, damp conditions occur.

Inoculum of smuts and bunts will still be present on and in seed following the drought so failure to treat seed this year will run the risk of building up these diseases.

There is a low risk of *Septoria tritici* blotch in wheat and scald in barley. Early sowing and wet weather in winter–spring can increase the risk of infection.

## Canola

### Blackleg

Sowing canola into stubble from 2005 should be avoided, because the stubble has not broken down and will contain blackleg inoculum. Blackleg inoculum mostly comes from the stubble of the previous year's canola. However, because of the drought, 2005 stubble remains a source of inoculum for 2007.

In 2006, no blackleg was observed in NSW, some was observed in high rainfall areas of VIC and high levels were observed in SA.

Canola sown into a failed canola crop that had blackleg in 2006 or adjacent to these crops would be at high risk of blackleg.

If sowing into a high risk area is the only option available, use all management precautions possible:

- Be aware of potential herbicide carryover from last year.
- Check for blackleg on remaining stubble, including pieces beneath the soil. Dead tissue can be infected with blackleg. Current resistances occur in living plant tissue.
- Choose a variety with a high blackleg resistance (rating 7 or above).
- Use a fungicide with the fertiliser and or a fungicide seed coating.
- Be aware that this is a high risk option.
- Do not consider canola-on-canola in paddocks with more than 100 kg/ha of stubble.

Recent research on spore production from canola stubble has shown that even 100 kg/ha of stubble will produce moderate numbers of spores. There is typically more than 1,200 kg/ha of canola stubble present after the following cereal crop has been sown.

## Sclerotinia

The risk from *Sclerotinia* remains unchanged for 2007.

Petal infestation in southern NSW during early flowering in 2006 was extremely low.

No *Sclerotinia* stem rot was recorded at the end of 2006.

*Sclerotinia* stem rot levels have in general been low since 2002, due to dry finishes to the season but petal infestation during flowering has varied from year to year. Therefore, in 2007 the risk from *Sclerotinia* stem rot will depend on favourable seasonal conditions.

## Pulses

Although very little fungal disease was observed on pulse crops in 2006, paddock selection should follow the usual recommendations. That is, pulse crops in 2007 should be a minimum of 500 m from the 2006 crop of the same pulse. In addition, because there has been little breakdown of 2005 residues, we advise avoiding sowing within 500 m of 2005 crops of the same pulse if possible.

If a 'good year' eventuates in 2007, then waterlogging in pulses may be a problem. Good paddock choice and species choice are still vital.

Seed from 2005 may be better quality for sowing in 2007 than seed from the 2006 harvest (see below for the need for seed testing). Don't neglect CMV seed testing in narrow-leaf lupins, and bitter seed testing in albus lupins.

### Field peas

Field peas, being late sown, allow weeds that have become problems because of drought to germinate on early rains and be controlled by knockdown herbicides or cultivation.

Providing they are not sown adjacent to 2006 residues and with a 4-year break from peas in the same paddock, there is minimum risk of disease to field peas. New information on varieties with resistance to bacterial blight will be available in early 2007 to assist in choosing a suitable variety.

Field peas provide an excellent break for soil and stubble borne diseases of cereal crops. They will provide a cash flow in 2007 while setting up the paddock for cereals in 2008.

### Ascochyta blight in chickpeas

Dry conditions in 2001 and 2002 did not favour *Ascochyta* and the chickpea industry felt that the *Ascochyta* risk for the 2003 season would be low. As many growers discovered the hard way, this was a mistake. The 2006 season was also not

conducive to Ascochyta but let's not repeat in 2007 what happened in 2003. Remember, the year following a drought often has average or above average rainfall. Chickpea Ascochyta needs wet plants to infect and cause damage.

Many farmers who plant chickpeas in 2007 will be new to the crop and managing Ascochyta will be an important part of producing a profitable crop.

Chickpea Ascochyta survives on chickpea residue, infected seed and volunteer chickpeas over summer. If there's been enough rain to establish volunteer chickpeas, some will carry Ascochyta. Destroy these volunteers as soon as possible and follow the Ascochyta disease management recommendations.

### **Beware the green bridge**

Despite the drought, virus levels in some 2006 crops were high, including *Wheat streak mosaic virus* and *Barley yellow dwarf virus* in wheat and *Bean leaf roll virus* in many pulses.

Viruses, aphids and rusts may be a problem in 2007 if a green bridge/ramp is available over summer enabling levels to increase and infect emerging crops. This is exacerbated in a drought by un-harvested small seed falling to the ground that enables volunteers to appear when there is summer rain.

If the start of the 2007 season remains dry, aphids, viruses and rusts will not be an issue because numbers will not have an opportunity to build up on volunteers and weeds.

If conditions become wet during the summer, consider whether aphid control is needed for new crops.

There have been some changes in pesticide registration and you will need to check with local suppliers as to what is available this year.

### **Burning stubble to control disease**

Burning stubble is not effective for reducing inoculum of some diseases. Diseases that survive at the base of stubble or in the soil, such as take-all and crown rot in cereals and *Sclerotinia* in broadleaf crops, may not be killed because temperatures at and below ground level are not hot enough.

### **Seed quality**

Obtaining good quality seed after a drought may be an issue in many regions in 2007. Early reports on seed harvested in 2006 are that, although yield was very low, some seed is of large size and excellent quality. However, other seed is small. If in

any doubt about seed quality, have seed that you plan to sow in 2007 tested for germination.

Not accounting for low germination can result in poor crop establishment, limiting yield potential and creating problems with weed control.

Sowing high vigour seed is also critical, as a healthier plant will have a more rapidly growing root system to obtain nutrient and moisture from the soil, be more competitive with weeds and less susceptible to diseases.

### **Unknowns**

There may be other and unexpected disease problems caused by the drought. For example, the high level of *Rhizoctonia* root rot in 2003 after the 2002 drought was unexpected. Please report any unusual disease development to your adviser and this will add to our store of knowledge for future disease management.

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